

### **REMARKS**

The Examiner's Office Action dated on December 13, 2005 has been received and its contents carefully considered. The Amendment has canceled claims 3 and 18 and amended claims 1, 2, 4, 5, 15, 16, and 19, with the features of claims 3 and 18 incorporated into claims 1 and 15, respectively, wherein claims 1, 15, and 30 are the independent claims. For at least the following reasons, it is submitted that this application is in condition for allowance.

#### **Rejection under 35 U.S.C. §102**

Claims 1-4, 13-19, 28, and 29 have been rejected under 35 U.S.C. 102(b) as being anticipated by *Nishihara* (U.S. Patent No. 6,014,126). Independent claims 1 and 15 have been amended to more specifically define the subject matter, wherein the features recited in canceled claims 3 and 18 are incorporated into claims 1 and 15, respectively. It is submitted that claims 1, 2, 4, 13-17, 19, 28, and 29 are patentable over the cited reference for at least the following reasons.

It is well settled that a reference may anticipate a claim within the purview of 35 USC section 102 only if all the features and all the relationships recited in the claim are taught by the reference structure either by clear disclosure or under the principle of inherency.

Applicant's independent claim 1 recites a method of frame processing in which a plurality of frames are sequentially fed into a frame processing device at a first refresh rate. After a first input frame is input, a second input frame is input into the frame processing device. **A plurality of corresponding output frames are determined according to the**

**first and second input frames with respect to difference in pixel data between the first and second input frames and with respect to a second refresh rate greater than the first refresh rate, to increase the pixel response rate. The output frames sequentially are outputted from the frame processing device at the second refresh rate.**

In contrast, *Nishihara* discloses that a frequency converting circuit 2 in FIG. 1 includes a **first-in-first-out (FIFO) memory 4 for storing the display data S2 of one frame, and the display data S2 from a display controller 1 are written into the FIFO memory 4 as image data based on a writing control signal S3, and in particular, having been written into the FIFO memory 4, the image data are read out from the FIFO memory 4 based on a readout control signal S6, and sent to a display device 10b as the display data S7 (see col. 7, lines 32-39 and 53-57). The image data are read out from the FIFO memory 4 faster than they are written into the same. As a result, the display data S7 are generated to have a second frame frequency higher than the first frame frequency of the display data S2, and the image data can be read out a number of times from the FIFO memory 4 while the image data of one frame are written into the same (see col. 7, lines 32-64).**

In this respect, although the Examiner is correct in stating that *Nishihara* teaches the second refresh rate is greater than the first refresh rate, *Nishihara*'s teaching of outputting image data read from the FIFO memory faster than the image data being written into the same fails to disclose or even suggest determining corresponding output frames, as claim 1 requires. That is, *Nishihara* does not teach that a **plurality of corresponding output frames are determined "according to the first and second input frames with respect**

**to difference in pixel data between the first and second input frames and with respect to a second refresh rate greater than the first refresh rate to increase pixel response rate, wherein the second input frame is input into the frame processing device after the first input frame is input claim 1.”**

Further, this reference provides no suggestion or motivation to one of ordinary skill in the art at the time of the invention to modify the teaching of *Nishihara* to arrive at the claimed invention. For at least the above reasons, claim 1, as amended, is not anticipated, or rendered obvious, by the cited reference. Claim 1 patently defines a method of frame processing over the teachings of *Nishihara*. Claims 2, 4, 13, and 14 depending from claim 1 are also patently over the cited reference.

Moreover, claim 2, depending from claim 1, includes additional features that “the relationship among the first and second input frames and the corresponding output frames with respect to difference in pixel data between the first and second input frames and with respect to the second refresh rate is pre-stored in the frame processing device, and the output frames are determined according to the relationship to increase pixel response rate when the output frames are outputted at the second refresh rate”, which are neither disclosed or suggested by the cited reference. Therefore, it is respectfully submitted that the rejection of claims 1, 2, 4, 13, and 14 should be withdrawn.

The Examiner has also rejected independent claim 15 for the same rationale as applied to claim 1. Claim 15, as amended, recites

a frame processing apparatus for controlling a plurality of frames to be fed into a display panel, the frame processing apparatus comprising:

a storing component for receiving a first input frame and a second input frame, wherein the first and second frames are input into the storing component at a first refresh rate; and

**an output component, connected to the storing component, for sequentially outputting a plurality of output frames according to the first and second input frames at a second refresh rate greater than the first refresh rate, wherein the output frames are outputted with respect to difference in pixel data between the first and second input frames and with respect to the second refresh rate to increase pixel response rate.**

*Nishihara* discloses that a frequency converting circuit 2, which is relied on by the Examiner as allegedly disclosing the frame processing apparatus of claim 15, writes image data into the FIFO memory 4, and then outputs the image data read from the FIFO memory 4 in a faster frequency. However, *Nishihara* fails to disclose or even suggest an “output component, connected to the storing component, for sequentially outputting a plurality of output frames according to the first and second input frames at a second refresh rate greater than the first refresh rate, wherein **the output frames are outputted with respect to difference in pixel data between the first and second input frames and with respect to the second refresh rate to increase pixel response rate.**”

As such, claim 15, as amended, is neither anticipated nor rendered obvious by *Nishihara*. Claim 15, and claims 16, 17, 19, 28, and 29, depending from claim 15, therefore are deemed clearly to be patentable over the cited reference.

Moreover, the dependent claims further patentably distinguish the invention over *Nishihara*. For example, claim 16 recites the features that the “output component comprises a memory device which stores a lookup table having entries about the relationship among the output frames and the first and second input frames to increase pixel response rate, and the output component outputs the output frames at the second

refresh rate according to the lookup table,” which are not disclosed or even suggested by the cited reference.

Accordingly, the rejection of claims 15, 16, 17, 19, 28, and 29 should be withdrawn.

#### **Rejection under 35 U.S.C. §103(a)**

Claims 5-12, 20-27, and 30-34 have been rejected under 35 U.S.C. 103(a) as being unpatentable over *Nishihara* in view of applicant’s admitted prior art (*AAPA* ) (see FIGS. 2A, 2B, and section [0006] of the specification). Initially it is noted that claims 5 and 9 depend from independent claim 1, claims 6-8 depend from claim 5, and claims 10-12 depend from claim 9. Moreover, claims 20 and 24 depend from independent claim 15, claims 21-23 depend from claim 20, and claims 25-27 depend from claim 24. Further, claims 31-34 depend from independent claim 30. The rejection is respectfully traversed.

In rejecting claims 5 and 20, the Examiner acknowledges that *Nishihara* does not disclose the output frames having at least one overdrive output frame. However, the Examiner asserts that the *AAPA* teaches that it is well known in the art for driving a display using an overdrive voltage (overdrive output frame) to increase the pixel response rate, the overdrive voltage (e.g., V3) is higher than a voltage (e.g., V2) which is output from an output frame (section [0006] of the specification). The Examiner also asserts that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify *Nishihara* to have the overdrive output frame as taught by the admitted prior art so as to increase the pixel response when pixel luminosity needs to be increased. The applicant would respectfully disagree with this rejection.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be a showing of some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success to obtain the invention by such modification or combination. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. (See MPEP 2143 Basic Requirements of a Prima Facie Case of Obviousness). The teaching or suggestion to make the claimed combination and the reasonable expectation of success both must be found in and from the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

It is respectfully submitted that the rejection of claims 5 and 20 does not fulfill the requirement for a *prima facie* case of obviousness and the rejection should be withdrawn, for the following reasons.

In rejecting the claims, after pointing to the *AAPA* as disclosing the “overdrive output frame,” the Examiner asserts that “[i]t would have been obvious to one having ordinary skill in the art at the time the invention was made to modify *Nishihara* to have the overdrive output frame as taught by the admitted prior art so as to increase the pixel response when pixel luminosity needs to be increased.” This conclusory statement is made without providing any reasoning in the prior art to support the desirability of modification as proposed by the Examiner. Moreover, being aware of the legal requirement that the suggestion of modification or combination must be found in the prior art, not in applicant's disclosure, one may ask what supports that the assertion that “it would have been obvious

to one having ordinary skill in the art at the time the invention was made to modify Nishihara to have the overdrive output frame as taught by the admitted prior art so as to increase the pixel response when pixel luminosity needs to be increased.”

It is submitted that *Nishihara* and the *AAPA* do not teach, disclose, or suggest the proposed modification. Knowing from *Nishihara* that “frame response phenomenon is conspicuous when the liquid crystal element is made of a liquid crystal material with a relatively quick response, and the contrast degrades as a result” (col. 1, lines 30-33) and “the second frame frequency is not a frame frequency such that enables the high-frequency driven display device to render the optimal display characteristics in most of the cases, thereby presenting a problem that ghosts or flickers appear on the screen” (col. 2, lines 12-17), *Nishihara* solves the problems of frame response phenomenon occurring when image data is displayed by a direct type liquid crystal display at a first frame frequency by outputting the image data at a non-integral multiple of the first frame frequency. Consistent with the discussion of patentability of claims 1 and 15, from which claims 5 and 20 depend, *Nishihara* does not provide any suggestion or motivation to one of ordinary skill in the art to modify his teachings for solving the problems due to frame response phenomenon in the way proposed by the Examiner to increase pixel response rate. On the other hand, there is no teaching or suggestion in the admitted prior art to suggest the modification proposed by the Examiner to increase pixel response rate.

For at least the above reasons, the rejection of claims 5 and 20 does not fulfill the requirement for a *prima facie* case of obviousness, and the rejection should be withdrawn.

Further, it is submitted that *Nishihara* and the *AAPA* do not disclose, teach, or suggest all features of the rejected claims, for the following reasons.

Claims 5 and 20 depend from independent claims 1 and 15 respectfully. As above discussion of the patentability of claims 1 and 15, claims 1 and 15 are not anticipated or rendered obvious by *Nishihara*. In particular, *Nishihara* fails to disclose or suggest the features of claim 1 that a plurality of corresponding output frames are determined “according to the first and second input frames with respect to difference in pixel data between the first and second input frames and with respect to a second refresh rate greater than the first refresh rate to increase pixel response rate, wherein the second input frame is input into the frame processing device after the first input frame is input.”

In rejecting claims 5 and 20, the Examiner admits that *Nishihara* fails to disclose the output frame having at least one overdrive output frame, as set forth in claims 5 and 20. However, the Examiner points to the *AAPA*. The *AAPA* discloses with reference to FIG. 2A that “the input pixel voltage needs to be raised from V1 to V2 in order to raise the luminosity from B1 to B2 when frame f2 is displayed”, and “[i]n order to increase the response rate, a pixel voltage V3, which is higher than V2, is input when frame f2 is displayed.” However, the *AAPA* does not teach, disclose, or even suggest the features missing from *Nishihara*. That is, the *AAPA* fails to disclose or suggest the output frames required by claim 1.

Moreover, the *AAPA* does not teach or even suggest the features recited in claim 5. Claim 5 recites that “the second input frame includes a second pixel datum, and the first input frame includes a first pixel datum that corresponds to the second pixel datum; when



the second pixel datum is greater than the first pixel datum, it indicates that the output frames include at least one overdrive output frame and the overdrive output frame includes an output pixel datum which is greater than the second pixel datum.” Since the *AAPA* does not teach or suggest a plurality of output frames are determined “according to the first and second input frames with respect to difference in pixel data between the first and second input frames and with respect to a second refresh rate greater than the first refresh rate to increase pixel response rate,” as claim 1 requires, the *AAPA* does not teach or suggest that “the output frames include at least one overdrive output frame and the overdrive output frame includes an output pixel datum which is greater than the second pixel datum,” as claim 5 requires.

For at least the above reasons, it is respectfully submitted that claims 5 and 20 distinguish the invention over *Nishihara* and the *AAPA* , and the rejection accordingly should be withdrawn.

Regarding claims 6, 10, 21, 25, the Examiner asserts that “*Nishihara* as modified by the admitted prior art would have the overdrive output frame outputted from the frame processing device as claimed.” The applicant respectfully would disagree with this rejection.

Consistent with the above discussion that no suggestion is provided as to desirability of the modification proposed by the Examiner, it is respectfully submitted that the rejection of claims 6, 10, 21, 25 and 20 does not fulfill the requirement for a *prima facie* case of obviousness, and the rejection accordingly should be withdrawn. Moreover, being aware of the legal requirement that the suggestion of modification or combination

must be found in the prior art, not in applicant's disclosure, one may ask what "Nishihara as modified by the admitted prior art" is, how it would have been suggested, and why "Nishihara as modified by the admitted prior art" **would have** "the overdrive output frame outputted from the frame processing device as claimed". No satisfactory answer to these questions is provided. Thus, the rejection of the claims should be withdrawn.

Regarding claims 8, 9, 12, 23, 24, 27, the Examiner acknowledges that the admitted prior art does not explicitly disclose an overdrive compensation output frame. The Examiner asserts that the admitted prior art teaches using overdrive voltages to increase the pixel response rate when the pixel luminosity needs to be increased. The Examiner asserts that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify *Nishihara* as modified by the admitted prior art to have the overdrive compensation output frame as claimed to compensating the pixel data that is smaller than the second pixel data or greater than the second pixel datum so as to provide an uniform pixel luminosity over the entire display." The applicant respectfully would disagree with this rejection .

Consistent with the above discussion that no suggestion is provided as to desirability of the modification proposed by the Examiner, it is respectfully submitted that the rejection of claims 8, 9, 12, 23, 24, 27 does not fulfill the requirement for a *prima facie* case of obviousness and the rejection should be withdrawn. Besides, being aware of the legal requirement that the suggestion of modification or combination must be found in the prior art, not in applicant's disclosure, one may ask what supports the conclusory assertion of the Examiner, what "Nishihara as modified by the admitted prior art" is, how it would

work, how to modify “Nishihara as modified by the admitted prior art” which is not specified by the Examiner, where in the prior art to suggest the modification of “Nishihara as modified by the admitted prior art” in the way proposed by the Examiner. The Examiner has not provided answers to these questions.

In addition, since the *AAPA* does not disclose an overdrive compensation output frame, one may ask how “*Nishihara as modified by the admitted prior art*” would be modified to produce the “overdrive compensation output frame” as recited in the rejected claims.

Claim 8 and claim 5, recite:

5. The method according to claim 1, wherein the second input frame includes a second pixel datum, and the first input frame includes a first pixel datum that corresponds to the second pixel datum; when the second pixel datum is greater than the first pixel datum, it indicates that **the output frames include at least one overdrive output frame** and the overdrive output frame includes an output pixel datum which is greater than the second pixel datum.

8. The method according to claim 5, wherein **the output frames have among them an overdrive compensation output frame** which is output from the frame processing device **after the overdrive output frame** and includes a pixel data that is smaller than the second pixel data.

According to claims 5 and 8, **the output frames determined according to the first and second input frames**, as claim 1 requires, **includes**, when the second pixel datum is greater than the first pixel datum, **at least one overdrive output frame**, as claim 5 requires, **and includes, among the output frames, an overdrive compensation output frame which is output ... after the overdrive output frame**, as claim 8 requires. It is respectfully submitted that these features of claims 5 and 8 are not taught, disclosed, or

even suggested by the cited reference and the *AAPA*. In addition, claims 23 and 27 include features similar to those recited in claim 8.

For at least the above reasons, it is respectfully submitted that claims 8, 9, 12, 23, 24, and 27 distinguish the invention over *Nishihara* and the *AAPA*, and the rejection accordingly should be withdrawn.

Regarding claims 7 and 22, the Examiner asserts that the admitted prior art teaches using overdrive voltages to increase the pixel response rate when the pixel luminosity needs to be increased. The Examiner asserts that “*Nishihara* as modified by the admitted prior art would have display luminosity of a pixel of the display device according to the output pixel datum is greater than the display luminosity of the pixel according to the second datum as claimed so as to provide an uniform pixel luminosity over the entire display.” The applicant would respectfully disagree for the following reason.

Consistent with the above discussion that no suggestion is provided as to desirability of the modification proposed by the Examiner, it is respectfully submitted that the rejection of claims 7 and 22 does not fulfill the requirement for a *prima facie* case of obviousness and the rejection accordingly should be withdrawn. Besides, being aware of the legal requirement that the suggestion of modification or combination must be found in the prior art, not in applicant's disclosure, one may ask what supports the conclusory assertion of the Examiner, what “*Nishihara* as modified by the admitted prior art” is, how it would work, how “*Nishihara* as modified by the admitted prior art” which is not specified in the Office Action would have “display luminosity of a pixel of the display device according to the output pixel datum is greater than the display luminosity of the

pixel according to the second pixel datum as claimed so as to provide an uniform pixel luminosity over the entire display.” No satisfactory answer has been provided to these questions. For at least the above reasons, it is respectfully submitted that claims 7 and 22 distinguish the invention over *Nishihara* and the *AAPA*, and the rejection accordingly be withdrawn.

Regarding claims 11 and 26, the Examiner asserts that the admitted prior art teaches using overdrive voltages to increase the pixel response rate when the pixel luminosity needs to be increased. The Examiner asserts that “*Nishihara* as modified by the admitted prior art would have display luminosity of a pixel of the display device according to the output pixel datum is less than the display luminosity of the pixel according to the second pixel datum as claimed so as to provide an uniform pixel luminosity over the entire display.” The rejection respectfully would disagree with the Examiner’s conclusions

Consistent with the above discussion that no suggestion is provided as to desirability of the modification proposed by the Examiner, it is respectfully submitted that the rejection of claims 11 and 26 does not fulfill the requirement for a *prima facie* case of obviousness and the rejection should be withdrawn. Besides, being aware of the legal requirement that the suggestion of modification or combination must be found in the prior art, not in applicant’s disclosure, one may ask what supports the conclusory assertion of the Examiner, what “*Nishihara* as modified by the admitted prior art” is, how it would work, how “*Nishihara* as modified by the admitted prior art” which is not specified by the Examiner **would have** “display luminosity of a pixel of the display device according to the output pixel datum is less than the display luminosity of the pixel according to the second

datum as claimed so as to provide an uniform pixel luminosity over the entire display.”

For at least the above reasons, it is respectfully submitted that claims 11 and 26 distinguish the invention over *Nishihara* and the *AAPA*, and the rejection accordingly should be withdrawn.

As to claim 30, the Examiner applies the same rationale for rejection of claim 5. The rejection is respectfully traversed. Consistent with the above discussion that no suggestion is provided as to desirability of the modification proposed by the Examiner for claim 5, it is respectfully submitted that the rejection of claim 30 does not fulfill the requirement for a *prima facie* case of obviousness and the rejection should be withdrawn.

Applicant's independent claim 30 recites:

30. A method of frame processing in which a plurality of frames are sequentially input into a frame processing device at a first refresh rate, wherein the frame processing device controls a refresh rate of the frames to be displayed in a liquid crystal display (LCD) panel, the method comprising the steps of:

inputting a first input frame;

inputting a second input frame;

**determining a plurality of corresponding output frames in accordance to the first and second input frames; wherein the second input frame is input into the frame processing device after the first input frame is input and the relationship between the output frames and the first and second input frames is pre-stored in the frame processing device; and**

outputting the output frames sequentially from the frame processing device at a second refresh rate;

**wherein at least one overdrive output frame is among the output frames; when a second pixel datum of the second input frame is greater than a corresponding first pixel datum of the first input frame, a corresponding output pixel datum of the overdrive output frame is greater than the second pixel datum; when the second pixel datum of the second input frame is less than the first pixel datum, the output pixel datum is less than the second pixel datum.**

It is respectfully submitted that *Nishihara* and the *AAPA* fail to disclose, teach, or suggest at least the above-emphasized features recited in claim 30. For at least this reason,

it is respectfully submitted that claim 30 distinguish the invention over *Nishihara* and the *AAPA*, and the rejection accordingly should be withdrawn.

As to claim 32, the Examiner asserts that *Nishihara* teaches the relationship among the input frames and the corresponding output frames is determined (set by the clock generating unit) by the physical properties of the LCD panel, the luminance of the LCD panel, and the brightness perceived by human eyes (col. 7, lines 58-65). The applicant respectfully would disagree with this rejection.

Claim 32 recites:

32. The method according to claim 30, wherein **the relationship between the first and second input frames and the output frame is determined by the physical properties of the LCD panel, the luminance of the LCD panel, and the brightness perceived by human eyes.**

By contrast, the cited passage of *Nishihara* (col. 7, lines 58-65) sets forth:

The frequency of the standard clock S4 is set in such a manner that **the image data are read out from the FIFO memory 4 faster than they are written into the same.** As a result, the display data S7 are generated to have the second frame frequency higher than the first frame frequency of the display data S2, and **the image data can be read out a number of times from the FIFO memory 4 while the image data of one frame are written into the same** (*emphasis added*).

This cited passage fails to disclose, teach, or suggest that **“the relationship between the first and second input frames and the output frame is determined by the physical properties of the LCD panel, the luminance of the LCD panel, and the brightness perceived by human eyes”**, as claim 32 requires. Rather, this cited passage recites that “the image data are read out from the FIFO memory 4 faster than they are written into the same” and “the image data can be read out a number of times from the FIFO memory 4 while the image data of one frame are written into the same.” For at least

the above reason, as well as the discussion as to patentability of claim 30 from which claim 32 depends, it is respectfully submitted that claim 32 distinguishes the invention over *Nishihara* and the *AAPA*, and the rejection accordingly should be withdrawn.

As to claims 33 and 34, the Examiner asserts that *Nishihara* teaches the output data from the frame memory can be converted into display voltages for driving the LCD display, such that higher output datum (higher voltage) would have a higher luminosity of a pixel, lower output datum (lower voltage) would have a lower luminosity of a pixel. The respectfully disagrees with this rejection.

Applicant's claims 33 and 34 recite:

33. The method according to claim 30, wherein when the output pixel datum is greater than the second pixel datum, the luminosity of a pixel, in accordance with the value of the output pixel datum, of the LCD panel is greater than luminosity of the pixel in accordance with the value of the second pixel datum.

34. The method according to claim 30, wherein when the output pixel datum is less than the second pixel datum, the luminosity of a pixel, in accordance with the value of the output pixel datum, of the LCD panel is less than luminosity of the pixel in accordance with the value of the second pixel datum.

Claim 30 sets forth that "when a second pixel datum of the second input frame is greater than a corresponding first pixel datum of the first input frame, a corresponding output pixel datum of the overdrive output frame is greater than the second pixel datum; when the second pixel datum of the second input frame is less than the first pixel datum, the output pixel datum is less than the second pixel datum."

Since claims 33 and 34 depend from claim 30, for at least the reasons consistent with the discussion as to patentability of claim 30, it is respectfully submitted that claims



33 and 34 distinguish the invention over *Nishihara* and the *AAPA*, and the rejection accordingly should be withdrawn.

Finally, Applicant respectfully submits that the arguments in the Office Action for obviousness are classic examples of impermissible hindsight reasoning and, in particular, respectfully asserts that the Examiner has pointed to no teaching within the reference that relates to the desirability of combining the selected features. As discussed above, it is the prior art which must properly suggest the desirability of combining or modifying the particular elements, for it is axiomatic that all elements and features are taught somewhere in the prior art. Thus, for at least these reasons, as a matter of law, it is respectfully submitted that the obviousness rejections be withdrawn.

### **Conclusion**

For the foregoing reasons, it is respectfully submitted that this application is in condition for allowance such a Notice, with allowed claims 1, 2, 4-17, 19-34, earnestly is solicited.

Should the Examiner feel that a conference would be helpful in expediting the prosecution of this application, the Examiner is hereby invited to contact the undersigned counsel to arrange for such an interview.

Should any fee be required, please charge the same to our Deposit Account No. 18-0002 and advise us accordingly.

Respectfully submitted,



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March 13, 2006  
Date

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